Events and highlights on the progress related to recovery operations at Fukushima Daiichi Nuclear Power Station

November, 2014

Section 1: Executive summary

(1) The fact sheet uploaded in the link below is a summary of the current situation
http://www.kantei.go.jp/foreign/96_abe/decisions/2014/pdf/140221factsheet.pdf

(2) Information update from the previous fact sheet

The following information was updated from the previous fact sheet: 1) important events that happened after October 2013 were added and 2) examples of "preventive and multi-layered" measures that were additionally adopted in December 2013.

(3) The previous fact sheet is available online at
http://iaea.org/newscenter/news/2014/infcirc_japan0314.pdf

Section 2: Current conditions and forecast onsite

2.1: Relevant information pertaining to issues related to the recovery (including spent fuel and fuel debris management)

(1) New Information

(i) Newly added topics (in the past months since August)

Newly added topics in the past months since August are as follows. For additional details of these issues, please refer to the "related information" section.

- Completion of the removal of the spent fuel assemblies (Tokyo Electric Power Company (TEPCO)) (November 5, 2014)
  http://www.tepco.co.jp/en/decommision/planaction/removal-e.html
- New high-performance water treatment system at Fukushima set to increase capacity by a third while cutting waste 90 percent (TEPCO) (October 21, 2014)
  http://www.tepco.co.jp/en/press/corp-com/release/2014/1243241_5892.html
- Discovery of a crack in a connection valve between tanks for concentrated water treated by Reverse Osmosis at Fukushima Daiichi NPS (Nuclear Regulation Authority (NRA)) (September 24, 2014)
  http://www.nsr.go.jp/english/newsrelease/data/20140924.pdf
- Status update report: Update on seawater quality near Fukushima Daiichi: All levels outside the port are within safe regulatory limits (TEPCO) (September 12, 2014)
  http://www.tepco.co.jp/en/press/corp-com/release/2014/1241751_5892.html
- Two facilities are set to improve water management at Fukushima (TEPCO) (August 13, 2014)
  http://www.tepco.co.jp/en/press/corp-com/release/2014/1240604_5892.html

- Detailed analysis results regarding the water quality of the groundwater being pumped out for by-passing at Fukushima Daiichi Nuclear Power Station (METI) (August 5, 2014) http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20140805_01a.pdf
- TEPCO takes major step forward at Fukushima UNIT 1 (TEPCO) (August 1, 2014) http://www.tepco.co.jp/en/press/corp-com/release/2014/1239910_5892.html
- TEPCO reports more progress at Fukushima, along with its other nuclear plants (TEPCO) (August 1, 2014) http://www.tepco.co.jp/en/press/corp-com/release/2014/1239909_5892.html

(ii) Notable topics among recent updates

(a) Fuel Removal at the Unit 4
At the time of the accident all of the fuel rods in Unit 4 had been transferred into and stored in the spent fuel pool as part of the periodic inspection (although a hydrogen explosion did occur). They survived relatively undamaged. Fuel removal work at Unit 4 started on November 18, 2013 and removal of all 1331 spent fuel assemblies was completed on November 5, 2014. With regard to the unirradiated (new) fuel assemblies, 22 out of 202 assemblies have been removed and transferred from the Unit 4 building to the common pool located within the station site. As a result, as of November 5, 2014, 1353 out of 1533 assemblies have been transferred to the common pool. Fuel removal is scheduled to be completed within the year 2014.

(b) The evacuation order upon Kawauchi village was lifted.
On October 1st, the government lifted the evacuation order upon the “Area to which evacuation orders are ready to be lifted”(*1) in Kawauchi village, Fukushima Prefecture. By lifting the order, the residents have come to be able to return to and live in their hometown. At the same time additionally, the part of the village that had been designated as “Area in which the residents are not permitted to live”(*2) was redesignated as "Area to which evacuation orders are ready to be lifted". Kawauchi village is the second case that the evacuation order was lifted, following Miyakoji area of Tamura city, Fukushima Prefecture.
*1 The region whose exposure dose level is estimated to be 20 mSv or less per year.
*2 The region whose exposure dose level is estimated to be between 20 mSV and 50 mSv per year.

(c) The restriction on vehicles’ passing through the part of national Route 6 was lifted.
On September 15th, the government lifted the restriction on vehicles’ passing through the part of national Route 6, which was imposed in March, 2011. The restricted part is located in “Area where it is expected that the residents have difficulties in returning for a long time”(*3). However, motorcycles, bicycles, or pedestrians are still not permitted to pass through the part. The reopened area is located between Futaba town and Tomioka town, which has 14 kilometers-length.
*3 The region whose exposure dose level is estimated to be above 50 mSv per year.

(d) The reported rise in radiation level of groundwater does not affect the off-site areas including the port and the sea area

In early October, a high level of radiation was detected from groundwater and stagnant water in drainage canals. In addition, the highest level was registered in some groundwater observation points . TEPCO provided explanation for this issue as follows: the rise in radiation level may be ascribed to heavy rain which was brought by typhoons which hit the area in October.

Even though the increase in the radiation level of the groundwater was observed, the rise in radiation level has not affected the off-site areas including the port and the sea area, and no significant change in radioactive caesium level has been detected inside and outside the port after the passing of the typhoon.

(e) Pumping up groundwater by the sub-drain system has started

Reducing groundwater flowing into the Reactor buildings and the seaside areas can be achieved by sub-drain water pumping. In addition to the Groundwater bypassing which is already in operation, pumping out groundwater from the point much closer to the turbine building is expected to have greater effect in reducing the amount of groundwater inflow to the buildings.

On August 11th, TEPCO applied for a change of plan of drain facilities to NRA and following August 12th, pumping out groundwater by the sub-drain system has started as a trial operation. After being pumped out, the groundwater goes through multi-nuclide removal equipment and after this decontamination process, the water condition will be checked (This analysis result of groundwater will be announced by TEPCO). TEPCO and the Government of Japan are now explaining the content, function, and its effect of this countermeasure to the local stakeholders, such as fishermen's unions and the Fukushima prefectural government. It has been made clear that without getting consent from these stakeholders, releasing this groundwater to the sea will not be conducted.

(f) TEPCO installed additional and new multi-nuclide removal equipment

The multi-nuclide removal equipment removes radionuclides from the contaminated water, and therefore reduces risk. The existing multi-nuclide removal equipment (known as ALPS: Advanced Liquid Processing System) aims to reduce the levels of 62 nuclides in contaminated water to the legal discharge limits or lower. (ALPS cannot remove tritium.)

In order to accelerate the processing of the contaminated water, TEPCO installed additional equipment similar to the existing one and a new type of equipment which provides higher performance than the existing one. The installation of the new type was financed by the Government, and the equipment is expected to boost water treatment capacity by 500 tons a day and raise total water treatment capacity to 2,000 tons a day. Also, it is able to reduce secondary wastes by more than ninety percent.

(g) Freezing the connection area of the trench and the turbine building is different from the installation of the frozen soil wall

(1) The frozen soil wall measure aims to reduce the volume of groundwater inflow into the buildings by surrounding the buildings with frozen-soil walls (a national subsidized project with the budget of JPY 31.9 billion). Technical validation for countermeasures for high-velocity groundwater and for controlling groundwater level has been conducted since last August, and small scale test succeeded in construction of frozen soil wall. The construction work began from June 2nd 2014 with the aim of starting the freezing operation in FY 2014.

In order to prepare for the installation of the frozen soil wall to prevent the groundwater from flowing into the turbine buildings, the contaminated water in the trench is needed to be removed. In this process, first, the connection area of the trench and the turbine building will be frozen. Next, the contaminated water inside the trench will be pumped out. Finally, water cutoff material will be injected into the trench and shafts. Regarding this measure, in order to avoid misunderstanding and confusion, it is needed to be understood that freezing the connection area of the trench and turbine building is different from the installation of the frozen soil wall.

It has been broadcasted that it is taking more time to complete the freezing abovementioned connection area than was originally scheduled. However, it is important to note that it is not the frozen soil wall that is facing difficulty and that it is not causing any negative impact on the leakage of the contaminated water. The small scale test has been successfully done for the frozen soil wall and as soon as the removal of the contaminated water from the trench is completed upon the success in freezing this connection area, the installation of the frozen soil wall will start. The Government of Japan will continue taking each countermeasure, including these specific measures, step by step together with TEPCO to solve the contaminated water issue.

As for the detailed information on freezing the connection area of the trench and the turbine building as well as the difference from the installation of the frozen soil wall, please refer to the following URL.
http://www.iaea.org/newscenter/news/2014/freezingmeasures220914.pdf

(2) As a measure to overcome the difficulty in freezing the abovementioned connection area of the trench and the turbine building, TEPCO is planning to fill up the trench by using a special kind of cement at the same time as the abovementioned measures (such as freezing the connection area and pumping out the contaminated water inside the trench) are conducted. TEPCO is aiming to blockade the trench, by removing the contaminated water and filling up the trench.

(h) In order to prepare for the removal of Unit 1 temporary cover, as a first step, TEPCO began taking measures on October 22 to prevent scattering of the radioactive materials at the debris removal work. This is a step towards dismantling the Unit. After drilling 48 holes on the rooftop, dust inhibitor will be sprinkled from these holes. The removal of the temporary cover itself is to be started next March.

On October 28, a sprinkler which was operating to sprinkle dust inhibitor above the Unit was pushed by a gust of wind and made a hole greater than expected, but no significant change was observed in air dose.

For further information on the measures to be taken regarding the removal of Unit 1 temporary cover, please refer to the video clip uploaded at the following URL.
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=kletx9w5&catid=61795

(i) Establishment of the new “Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF)”

(1) “Nuclear Damage Compensation Facilitation Fund”, which was established in 2011 in order to support the compensation for nuclear damage occurred during the accident at the TEPCO’s Fukushima Daiichi Nuclear Power Plant, has been reorganized to be “Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF) and now it is also in charge of some of the decommissioning issues. The new NDF is expected to

challenge the tasks with expertise and continuity which have not been sufficiently dealt with so far from Mid-and-long term landscape.

(2) The roles of the new NDF will be as follows:

i. Strategy planning of important issues including fuel debris retrieval and waste management

ii. Planning and schedule control of R&Ds needs.

iii. Support of schedule control of key items

iv. Enhancement of international cooperation

(j) Establishment of "International Collaborative Research Center on Decommissioning" (tentative name)

(1) Ministry of Education, Culture, Sports, Science and Technology (MEXT) is planning to establish an international research center on decommissioning bringing together expertise and knowledge from academia, industry and government. This research center is not only to provide technologies gathered during academia-industry-government cooperation to TEPCO and make research results reflected during the decommissioning and reconstruction of Fukushima, but it is also to provide a research database as an international public asset.

(2) The functions of the research center will be as follows:

i. Functioning as the center for international research with academia-industry-government

ii. Creating international collaborative research promotion system

iii. Contributing to human resources development

iv. Sharing research results with the international community

(k) Interim Storage Facility

(1)Necessity of Interim Storage Facility

Large amount of contaminated soils and waste have been retrieved during the decontamination work in Fukushima Prefecture. This contaminated soil has been sitting at temporary storage sites. Because it is currently difficult to specify the method of final disposal, it is necessary to establish Interim Storage Facilities for safe and secured storage until permanent disposal facilities are available.

(2)Recent updates of this item

The Minister of the Environment, Minister for Reconstruction, Governor of Fukushima Prefecture, Mayors of Okuma town and Futaba town had a meeting on September 1st 2014. The Governor of Fukushima Prefecture accepted the foundation of Interim Storage Facilities. Taking into account of governor's acceptance, two Mayors agreed with the Japanese government to commence an explanation for landowners of the candidate site.

(l) Positive effect on reduction of the groundwater inflow to the reactor building was brought about by "groundwater bypassing" at Fukushima Daiichi Nuclear Power Station

(1) Recent update

TEPCO announced this September that the operation of "groundwater bypassing" showed effects and the amount of groundwater flowing into the reactor buildings was decreased by 80m³ at the maximum per day.

(2) Conduct of "groundwater bypassing"

"Groundwater bypassing" is one of the countermeasures to reduce the volume of groundwater flowing into the buildings at TEPCO's Fukushima Daiichi Nuclear Power Station. This countermeasure is to pump out groundwater from wells at the mountainside area beside the reactor buildings and this groundwater will be released to the sea (bypassing) after passing the quality analysis survey. TEPCO and the Government of Japan have been explaining the content, function, and its effect of this countermeasure to the local stakeholders, such as fishermen's unions and Fukushima prefectural government.

In April 2014, the fishermen's unions showed their intention to accept the plan of conducting this groundwater bypassing. In addition, from April 9th, TEPCO has been making effort to prepare for the actual release of the groundwater such as water quality analysis of the groundwater being pumped up. On May 16th, TEPCO and the Government of Japan published water quality analysis results conducted by three different analysis agencies. These results show that the radioactive levels of sampled water were substantially below the operational targets (each of the target is set by TEPCO and these operational targets are set at the very low level compared to the legal discharge limits). As for the detailed analysis results of these three agencies, please refer to the table shown in the following link:
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/21140514_01a.pdf

Following the fact that TEPCO and the Government of Japan have reported and explained about these detailed analysis results to the local stakeholders, the Government of Japan decided to announce that the groundwater bypassing would be operated (i.e. groundwater being pumped out will be released to the sea) on May 21st.

Whenever TEPCO releases groundwater, government officials (*) will check the entire process of the release. In addition to this, TEPCO and the Government of Japan will publish detailed analysis results of the groundwater being pumped up on a regular basis in order to secure transparency.

* Staff from the Intergovernmental Liaison Office for Decommissioning and Contaminated Water Management near Fukushima Daiichi Nuclear Power Station.

Following this operation, the radioactive analysis of the sea water was conducted by TEPCO (the sea water used for this analysis was sampled during and after the operation at the nearest sea water sampling post from the groundwater releasing point) and no significant change of radioactivity was observed in the analysis. The sea water used for this analysis was sampled during and after the operation at the nearest sea water sampling post from the groundwater release point.

For further detail of the analysis result, please refer to the following TEPCO's website:
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/gw_drainage_140523-e.pdf

(iii) Information update on the decommissioning process

Progress status report is made monthly by METI. This report is the summary of the recent progress of the decommissioning made after the last progress status report was publicized. The summary and URL of the progress report is as follows:

- The Progress status report as of August28, 2014 is available online
  http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20140828_e.pdf

The report discusses many recent updates to the decommissioning process such as installing the additional and the high-performance multi-nuclide removal equipment. The following figures show some parts of the recent progress.

Figure 1: Overview of additional multi-nuclide removal equipment

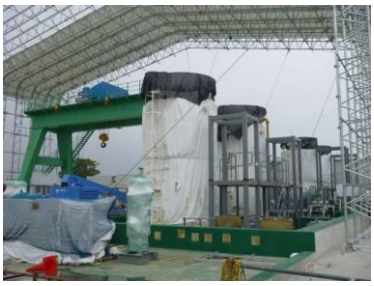

Figure 2: Installation status of high-performance

- The Progress status report as of September 25, 2014 is available online http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20140925_e.pdf

  The report discusses many recent updates to the decommissioning process such as test operation of additional multi-nuclide removal equipment and Installation of frozen-soil impermeable walls . The following figures show some parts of the recent progress.

Figure 3: Installation status of additional multi-nuclide removal equipment

Figure 4: Installation of chillers for freezing

(2) Related information

Information provided in the links below includes the description and the schedule of preventive and multi-layered measures for the contaminated issues in order to remove the source of contamination, isolate groundwater from contamination, and prevent further leakage of contaminated water. A summary and a full report are available at the following links.

(Summary)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/131210gaiyou_E.pdf

(Full report)

http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/131210report_E.pdf

As for other relevant issues, “METI’s website for decommissioning” covers various issues in detail:

- METI's website for decommissioning
  http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/index.html
  Progress Status and Future Challenges of the Mid-and-Long-Term Roadmap toward the Decommissioning of TEPCO’s Fukushima Daiichi Nuclear Power Station Units 1-4 (Outline) (Ministry of Economy, Trade and Industry (METI) (Updated on October 16, 2014)
  http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20140925_e.pdf
- For NRA’s recent news releases, please see the following link.
  http://www.nsr.go.jp/english/newsrelease/
- For TEPCO’s activities, please see TEPCO’s website.
  TEPCO's website for current situation of Fukushima Daiichi and Daini nuclear power stations
  http://www.tepco.co.jp/en/nu/fukushima-np/index-e.html

2.2 Recent incidents and progress (in the past months since July)

Related information:

- Immediate Release: Small fire from generator of rest house put out via extinguisher, no one injured (TEPCO) (July 15,2014)
  http://www.tepco.co.jp/en/press/corp-com/release/2014/1239153_5892.html
- Fukushima Plant unharmed by earthquake occurred on July 12th, all workers are safe, TEPCO reports (TEPCO) (July 12,2014)
  http://www.tepco.co.jp/en/press/corp-com/release/2014/1238987_5892.html

Section 3: Monitoring results

3.1: Onsite monitoring results reported by TEPCO

-3.1.1 Radionuclide releases to the atmosphere

(1) Outline of the item

On-going monitoring of the air at the site of the Nuclear Power Station has detected no significant increase in radiation levels.

(2) Noteworthy change in data in August and September

Except for the slight changes in the density of caesium-134, caesium-137 which were nearly negligible, the monitoring result is ND (ND indicates that the measurement result is below the detection limit). In this regard, no announcement has been made by TEPCO for this item.

* No change in the density of caesium-134 was reported in August and September.

* Slight changes in the density of caesium-137 were reported on August 1st and 22nd.

(3) Monitoring result data

The monitoring results in the air at the site of the Nuclear Power Station are available in the following webpage (Please see the calendar titled “in the air at the site of Power Station”). This monitoring result is updated every day on this site.

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

- 3.1.2 Radionuclide releases to the sea (including groundwater monitoring results)

(1) General outline of the item

Results of radioactive nuclide analysis are published for the samples of groundwater at the east side of the Unit 1-4 Turbine Buildings and seawater at the port in order to monitor the source and the extent of the radioactive materials in the groundwater, and to determine whether the materials included in groundwater affect the sea.

Increased radioactivity has been observed within the port, in an area smaller than 0.3 km^2. However, ongoing monitoring in the surrounding ocean area has detected no significant increase in radiation levels outside the port or in the open sea, and has shown that radiation levels in these areas remain within the standards of the World Health Organizations guidelines for drinking water.

(2) TEPCO’s report on radionuclide releases to the sea

TEPCO issued a report which includes progress and status of the ground improvement by sodium silicate. This report is available online: http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_2tb-east-e.pdf

In addition, the historical data of radioactive concentration in the groundwater sampled at the Unit 1-4 bank protection are available online with the csv format. The data from north of Unit 1, between intakes of Units 1 and 2, between intakes of Units 2 and 3, and between intakes of Units 3 and 4 are available at the following sites respectively.

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/2tb-east-newest02-e.csv

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/2tb-east-newest03-e.csv

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/2tb-east-newest04-e.csv

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/2tb-east-newest05-e.csv

(3) Related information

Analyses regarding radionuclide releases are conducted in different parts of the sea (outside of the port, inside of the port, and inside of the Unit 1-4 water intake

channel). Results of these analyses and analysis results of groundwater are as follows (the information is automatically updated daily).

- Analysis Results of Groundwater (Unit 1-4 Bank Protection)
  http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/tb-east_map-e.pdf
- Analysis Results of Seawater (Outside of the Port)
  http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/seawater_map-e.pdf
- Analysis Results of Seawater (Inside of the Port)
  http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/intake_canal_map-e.pdf
- Analysis Results of Seawater (Inside of Unit 1-4 Water Intake Channel)
  http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/2tb-east_map-e.pdf

3.2: Offsite monitoring results

1. Monitoring results of air dose rates in the 20 Km radius zone around Fukushima Daiichi Nuclear Power Station

   (1) Outline of the item

   The monitoring of air dose rates in the 20 Km radius zone around Fukushima Daiichi Nuclear Power Station has been conducted at 50 points in the zone (the types of detectors used for monitoring are NaI scintillation detectors and/or an ionization chamber type survey meters). The air dose rates in the 20 Km radius zone have continuously been decreasing since May 2011 (after the accident at Fukushima Daiichi Nuclear Power Station on March 11, 2011).

   (2) Noteworthy updates in the past months

   As described in (1) above, the air dose rates in the 20 Km radius zone around the Nuclear Power Station have been in a downward trend, and the monitored air dose rates were stable from August to October 2014. Based on these results, any further announcement was not made on this item (e.g., significant increase of air dose rates in the 20 Km radius zone) from August to October.

   (3) Monitoring results

   Each of the following URL leads to the monitoring results of air dose rates in the 20 Km radius zone around Fukushima Daiichi Nuclear Power Station from August to October 2014:

   August: http://radioactivity.nsr.go.jp/en/list/239/list-201408.html
   September: http://radioactivity.nsr.go.jp/en/list/239/list-201409.html
   October: http://radioactivity.nsr.go.jp/en/list/239/list-201410.html

   The following URL leads to an archive of monitoring results:
   http://radioactivity.nsr.go.jp/en/list/239/list-1.html

2. Monitoring results of dust in air and soil in the 20 Km radius zone around Fukushima Daiichi Nuclear Power Station

   (1) Dust

The monitoring results of dust obtained from August to October show that the concentrations of dust were either ND (ND indicates that the measurement result is below the detection limit) or very low. Based on the results, any further announcement was not made on this item (e.g., significant increase of the concentrations of dust) from August to October 2014.

The following URL leads to the monitoring results (dated 31 October, 2014) of dust:

http://radioactivity.nsr.go.jp/en/contents/10000/9065/24/223_20141031.pdf

(2) Soil

Radiation monitoring of soil is conducted as appropriate. The latest monitoring of soil was conducted during October 2014. The following URL leads to the monitoring results (dated November 4, 2014) of soil:

http://radioactivity.nsr.go.jp/en/contents/10000/9074/24/495_20141104.pdf

(3) Previous monitoring results

The following URL provides the previous monitoring results (from April 2011 to the present) of dust in air:

http://radioactivity.nsr.go.jp/en/list/240/list-1.html

3. Estimated values and measured values of environmental radioactivity at 1m height from the ground surface in other prefectures (46 prefectures in total) other than Fukushima Prefecture

(1) Outline

The air dose rates measured using the monitoring stations installed in other prefectures have mostly returned to the equal level of the air dose rates before the accident.

(2) Updates from August to October 2014

The estimated and measured values were relatively stable from August to October 2014. Based on the results, any further announcement was not made on this item (e.g., significant increase of the estimated and measured values) from August to October 2014.

(3) Monitoring results

The following URL leads to the estimated and measured values, and new monitoring results are uploaded nearly every day:

http://radioactivity.nsr.go.jp/en/list/192/list-1.html

3.3: Sea area monitoring results of seawater, sediment and biota

(1) Outline

Sea area monitoring results in the area around Fukushima Daiichi Nuclear Power Station have indicated that the radiation levels outside the port or in the open sea have been relatively stable.

(2) Updates during the period from August to October2014

The sea area monitoring results from August to October 2014 were relatively stable as described in (1) above. Based on the results, any further announcement was not made on this item (e.g., significant increase of sea area monitoring results) from August to October 2014.

(3) Related information

Sea area monitoring is classified to be conducted in 5 areas (Area 1: Sea area close to TEPCO's Fukushima Daiichi Nuclear Power Station, Area 2: Coastal area, Area 3: Off-shore area, Area 4: Outer sea area, and Area 5: Tokyo bay area), and this information is available under the "Monitoring of Sea Water" section of the NRA webpage entitled "Readings of Sea Area Monitoring". This webpage also includes monitoring results of sediment under the "Monitoring of Marine Soil" section, and it is also classified into 4 areas (Area 1: Sea area close to TEPCO's Fukushima Daiichi Nuclear Power Station, Area 2: Coastal area, Area 3: Off-shore area, Area 4: Tokyo bay area). The NRA has been providing a weekly report on sea area monitoring results. The "Readings of Sea Area Monitoring" webpage covers various issues and the webpage's information is periodically updated several times a week. The following URLs lead to this webpage and the weekly report on sea area monitoring results:

- Readings of Sea Area Monitoring
  http://radioactivity.nsr.go.jp/en/list/205/list-1.html
- Sea Area Monitoring (Weekly Report)
  http://radioactivity.nsr.go.jp/en/list/295/list-1.html
- F1 issues (NRA is providing monitoring results weekly to the IAEA which are openly shared with the public)
  http://www.nsr.go.jp/english/f1issues/index.html
  http://www.iaea.org/newscenter/news/2013/japan-basic-policy-full.html

Section 4: Off-site Decontamination

4.1: Outline

Off-site decontamination is in operation since the accident of Fukushima Daiichi Nuclear Power Station. Currently, target areas of decontamination are categorized as below.

4.1.1 Special Decontamination Area (SDA)

National Government is responsible for development of plans and implementation of measures for decontamination of SDA. SDA consists of the previous "restricted areas" located within a 20 km radius from the TEPCO Fukushima Daiichi Nuclear Power Station and the previous "deliberate

evacuation areas" where the additional annual effective dose for individuals was anticipated to exceed 20 mSv.

4.1.2 Intensive Contamination Survey Area (ICSA)

ICSA is the area where the air dose rate is over 0.23 uSv/h (equivalent to over 1 mSv/y of additional dose under a certain condition). 104 municipalities in 8 prefectures are designated as this Area at first. Decontamination for the area is implemented by each municipality with financial and technical supports by the national government.

4.2: Current status

4.2.1 SDA

- Development of decontamination plans for all 11 municipalities is completed.

- Decontamination work for 4 municipalities (Tamura-city, Kawauchi-village, Naraha-town, Okuma-town) has been completed in accordance with the decontamination plans

4.2.2 ICSA within Fukushima Pref. (Outside of Fukushima Pref.)

- Approximately 70% (100% in other prefectures) of planned decontamination projects for public facilities have been completed.

- Approximately 50% (90% in other prefectures) of planned decontamination projects for residential houses have been completed.

4.3: Related information

The MOE has also been conducting the technology demonstration projects for decontamination, aiming to promote the development of such technologies for effective and efficient decontamination and for the volume reduction of removed soils and wastes. The results of demonstration are to be published with the evaluation from the viewpoints of effectiveness, economic efficiency and so on.

The following URL leads to the web page of MOE's, which post information related to Decontamination:

- Measures for Decontamination of Radioactive Materials Discharged by the accident at the TEPCO's Fukushima Daiichi Nuclear Power Station.

http://josen.env.go.jp/en/

Section 5: Food products

5.1: Summary of testing

Food samples are routinely monitored to ensure that they are safe for all members of the public.

During the month of August 2014, 30,242 samples were taken and analysed. Among these samples, 35 samples were found to be above the limits (caesium-134+caesium-137: 100 Becquerel/kg). This represents 0.12 percent of all samples.

During the month of September 2014, 20,548 samples were taken and analysed. Among these samples, 47 samples were found to be above the limits (caesium-134+caesium-137: 100 Becquerel/kg). This represents 0.23 percent of all samples.

Restrictions are imposed on the distribution of food products, if the level of radioactive contaminants of the food product exceeds the limit (caesium-134+caesium-137: 100 Becquerel/kg). Restrictions are to be removed, when the level of radioactive contaminants of the food product is monitored to be constantly below the limit for a certain period of time. Therefore, the products on which the distribution restrictions are newly imposed are the products whose radioactive contaminant level exceeded the limit in the past month. By the same logic, the products whose restrictions are newly removed are the products whose radioactive contaminant level has been lower than the limit for a certain period of time.

5.2: Results of monitoring food products

(1) The current situation and protective measures

The fact sheet uploaded in the link below is the summary of the current situation and the measures taken by the Government of Japan:
http://www.mhlw.go.jp/english/topics/2011eq/dl/food-130926_1.pdf

(2) Noteworthy updates in the past months (in August and September)

The lists of food products whose status regarding the restriction was changed are as follows.

(i) Products whose distribution was newly restricted in August
- Wild mushrooms produced in Nishiaizu-machi, Fukushima prefecture

(ii) Products whose restrictions were removed in August
- Japanese dace captured in Okawa river in Iwate prefecture (including its branches)
- Japanese dace captured in Okawa river in Miyagi prefecture (including its branches)
- White spotted char (excluding farmed fish) captured in Tadami river (limiting between Honna dam and Uwada dam, but including its branches)
- Log-grown shiitakes (outdoor cultivation) produced in Tome-shi that is managed based on shipment and inspection policy set by Miyagi prefecture
- Log-grown shiitakes (indoor cultivation) produced in Sakura-shi and Haga-machi that are managed based on shipment and inspection policy set by Tochigi prefecture

(iii) Products whose distribution was newly restricted in September
- Common carp (excluding farmed fish) captured in Abukuma river in Fukushima prefecture (limiting upper reaches from Shinobu dam and including its branches)
- Wild mushrooms produced in Mishima-machi, Fukushima prefecture
- Wild mushrooms produced in Sendai-shi, Miyagi prefecture

(iv) Products whose restrictions were removed in September
- None

(3) Monitoring results data

See the link below (new monitoring results are added nearly every day):
http://www.mhlw.go.jp/english/topics/2011eq/index_food_radioactive.html

(4) Information focused on the safety of the fishery products

The information that is provided above in (1)-(3) cover fishery products, but in addition to this information, further detailed information is available on the Fisheries Agency's website

http://www.jfa.maff.go.jp/e/inspection/index.html

(i) Summary of monitoring on fishery products

The first half of the website consists of summary of monitoring on fishery products. For further information and to see the actions taken to ensure the safety of fishery products, please refer to the fact sheet uploaded in the site. This fact sheet is available in English, French, Spanish, Russian, Chinese and Korean.

(ii) "Report on the Monitoring of Radionuclides in Fishery Products" was released by the Fisheries Agency of Japan

Since the accident at the TEPCO's Fukushima Daiichi Nuclear Power Station (NPS), the Government of Japan and local authorities have cooperated closely with relevant bodies to secure the safety of fishery products. With an aim to promote accurate understanding on the safety of Japanese fisheries products at home and abroad, the data and information accumulated in the inspection of the last three years was evaluated comprehensively in this Report.

In Japan, in order to prevent the fishery products exceeding the limits from being distributed to the market, about 50 thousand samples of fishery species have been inspected by checking their levels of radioactive material; where the levels exceeded the limits, restrictions and suspensions on distribution and shipping were implemented appropriately.

In this Report, yearly trend of inspection results of radioactive caesium is displayed with respect to the main habitats and fish species. The radioactive caesium level in fishery products has greatly decreased, and today, samples exceeding 100 Bq/kg can be observed only in limited areas and fish species.

The report is available at the following URL:

(Full Report)

http://www.jfa.maff.go.jp/e/inspection/pdf/fullreport.pdf

(Summary)

http://www.jfa.maff.go.jp/e/inspection/pdf/summary.pdf

(iii) Monitoring results data

The second half of the website consists of various monitoring results on radioactivity measured in fishery products.

Section 6: Radiation Protection of Workers

Information pertaining to radiation protection of workers involving TEPCO's Fukushima Daiichi NPP Accident is updated on the following website of the Ministry of Health, Labour and Welfare (MHLW):

http://www.mhlw.go.jp/english/topics/2011eq/workers/index.html

6.1: TEPCO's Fukushima Daiichi NPP

The status on the exposure dose, health care management and radiation protection of the workers at TEPCO's Fukushima Daiichi NPP are as follows.

(1) Status of Radiation Exposure

Exposure doses of the workers at TEPCO's Fukushima Daiichi NPP are reported to the MHLW once a month. The latest monthly report is available on the following webpage:

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/index.html#sre

(2) Radiation Protection

Information on radiation protection of workers including measures to be taken and evaluation of committed effective dose of workers at the affected plant:

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/index.html#rp

(3) Long-term Health Care

Updated Information on long-term health care of emergency workers including health examination and guidelines;

"Policies for Epidemiological Studies Targeting Emergency Workers at the TEPCO's Fukushima Daiichi Nuclear Power Plant Have Been Compiled." is available on the following webpage. (Updated on June 4, 2014)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/lhc/pr_140604.html

(4) Other Related Topics

Updated other related information on the workers at TEPCO's Fukushima Daiichi NPP:

"Report of the Research on Thyroid Gland Examinations, etc. of Workers at the TEPCO's Fukushima Daiichi Nuclear Power Plant has been Released" is available on the following webpage. (Updated on August 5, 2014)

http://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/ort/pr_140805.html

6.2: Decontamination/Remediation

The status on radiation protection of the workers engaged in decontamination and remediation of contaminated materials derived from Fukushima Daiichi NPP Accident is as follows.

(1) Decontamination/Remediation

Updated Information on decontamination and remediation including guidelines and results of labour inspection:

"Results of Supervision/Instructions to Employers of Decontamination Works (January - June 2014)" is available on the following webpage. (Updated on August 8, 2014)

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/dr/pr_140807.html

(2) Waste Disposal

Information on waste disposal work including guidelines:

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/index.html#wd

(3) Other Related Topics

Other related information on waste disposal work:

http://www.mhlw.go.jp/english/topics/2011eq/workers/dr/index.html#ort

6.3: Related Information

(1) Press Releases

Press releases from the MHLW on radiation protection of workers are updated on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/index.html#pr

(2) Guidelines/Notifications

Guidelines and notifications from the MHLW on radiation protection of workers are available on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/index.html#gn

(3) Regulations/Legislations

Regulations and legislations of the MHLW on radiation protection of workers are available on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/index.html#rl

(4) Governmental reports

Governmental reports issued by the MHLW are available on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/index.html#gr

(5) Leaflets/Brochures

Leaflets and brochures published by the MHLW on radiation protection of workers are available on the following webpage.

http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/index.html#lb

Section 7: Actions taken by the Japanese Government

7.1: Currently implemented public protective actions in place (i.e., food restrictions)

1. Actions have been taken regarding food safety in August and September, 2014

   Actions to restrict food distribution or removal of these restrictions are taken based on monitoring results. For the products whose distribution was newly restricted or whose restrictions were removed in August and September, please refer to 4.2(2)

2. Further information on this topic is available online:

   http://www.mhlw.go.jp/english/topics/2011eq/index_food_press.html

3. Supplementary note (explanation for fishery products)

   The scope of the protective actions covers not only agricultural products but also fishery products. For further information about the monitoring result of the fishery products, please refer to Section 4.2(4).

7.2: Measures implemented to improve public communication

1. Information from the last months

   The Government of Japan has actively been strengthening its communication process to ensure timely dissemination of accurate information on the current status of activities onsite in multiple languages for the international community. In 2014 Japan provided updates in August on 4, 6, 13, 19 and 27, in September on 2, 9, 16, 22, 24 and 30, in October on 7, 14, 21 and 29, and so far in November 4. All of the updates provided to the IAEA are available on this webpage:
   http://www.iaea.org/newscenter/news/2013/japan-basic-policy-full.html

2. Relevant activities in disseminating information to the public

   (1) Press Conference

   Recovery operations at the Fukushima Daiichi Nuclear Power Station including contaminated water issues are one of the major issues which the Government of Japan has been focusing on. Since progress has been made frequently, there are updates arising on a daily basis. To explain the updates to the public, the Government of Japan disseminates the relevant information through press conferences. The Chief Cabinet Secretary and the Minister of Economy, Trade and Industry are the main briefers of the press conference, but other ministers or press secretaries may also be the briefer, depending on the subject.

   (2) Information delivery to media

The government has been providing relevant information for both the domestic and the foreign press including that stationed in Tokyo and for other media, using various means such as press conferences, press briefings, press tours and press releases. For example, the Fisheries Agency has conducted a media tour to a radioactivity monitoring site for fishery products (Marine Ecology Research Institute) in order to facilitate better understanding for monitoring on fishery products.

(3) Providing information to foreign nations through diplomatic channels

Whenever there is a significant update, the Ministry of Foreign Affairs sends out a notification with relevant information to all foreign missions stationed in Tokyo. The same information is conveyed to all Japanese embassies, consulate generals, and missions. As necessary, the information would be shared with foreign nations and relevant organizations through these diplomatic channels.

In addition, the Ministry of Foreign Affairs holds briefing sessions on Fukushima Daiichi Nuclear Power Station issues for the foreign missions stationed in Tokyo, when there is a significant update. The information on the last briefing session is shown in the link below.

http://www.mofa.go.jp/dns/inec/page22e_000505.html

(4) Measures taken by TEPCO

TEPCO has thus far been providing briefings on the status of Fukushima Daiichi Nuclear Power Station. In June and October 2014, in order to supplement such briefings, it has arranged for field observation tours of Fukushima Daiichi Nuclear Power Station for diplomatic officials and employees of embassies to Japan.

These briefings have been conducted with the aim of facilitating a correct understanding through the expeditious communication of accurate information outside of Japan, as well as maintaining TEPCO's accountability as the main party responsible for the accident.

The purpose of the field tours is to enable participants to observe the actual circumstances as they are at the power station by viewing and touring the actual site, in conjunction with the briefings at diplomatic missions. Moreover, TEPCO expects to utilize the network of diplomatic officials to build a new relationship, and provide a connection with TEPCO which had not been open before conducting these tours.

(5) Disseminating information to Japanese populations

In general, the information is shared with Japanese populations through the channels shown above in (1)-(2). In addition to these efforts, the Government of Japan has improved public communication by enriching the content of relevant ministries' webpage and by hosting a local briefing session on a case by case basis. METI regularly informs the progress of the decommissioning activities and contaminated water countermeasures to Fukushima prefecture and 13 local municipalities surrounding the site through video conference and direct visits.

3. Risk Communication

(1) Policy package regarding radioactive risk communication aiming for evacuees returning their home

In February 2014, the Government of Japan adopted a policy package regarding radioactive risk communication aiming for evacuees returning to their homes. The importance of addressing in detail each person's concern and apprehension is

expected to increase, and the Government of Japan decided to adopt a comprehensive package regarding risk communication based on such recognition.

This package includes following measures:

(i) Reinforce the ongoing risk communication approaches to further address the individual's concern and apprehension

Up until now, the Government of Japan provided relevant information to the public regarding the impact of radiation on one's health through various measures such as hosting a lecture session or seminar by inviting radiation experts to the evacuation site or supplying a range of publication magazines to affected people.

In addition to these measures, it is necessary to provide open communication for people to freely ask any questions. The Government will address this issue by recognizing that the people's perception on the impaction of radiation on one's health varies from person to person.

The Government of Japan will reinforce its risk communication approaches by taking finely textured measures to alleviate individual's concern in evacuation order municipalities.

(a) Providing information in an accurate and straightforward manner

(b) Reinforcing risk communication approaches to small groups of people (man to man or in an intimate setting)

(c) Capacity building of experts in local areas

(d) Enriching risk communication services being delivered by therapists who closely support the local regions

(ii) Continuous delivery of risk communication service to other areas in Fukushima and expanding to the national audience

Regarding the following measures for risk communication which intend to cover Fukushima prefecture as well as rest of other prefectures in Japan, the Government will feedback the on-site challenges, improve the content and delivery of the measures to more effective ones and would make continuous effort.

(a) Meetings to explain radioactive substances in food will be held, and experts who can communicate precise information corresponding to specific regions will be trained so that workshops, etc. will be held all over Japan. In addition, information dissemination about radioactive substances in food will be promoted through utilization of the Internet, provision of public information to consumers and so on.

(b) A telephone counseling service will be furnished to respond to inquiries from people with health anxiety due to radiation.

(c) Lectures, trainings, etc. about health effects of radiation will be provided.

(d) Teaching materials for schools about radiation will be prepared and distributed, and workshops, etc. for teachers will be held.

(e) Individual doses will be monitored with personal dosimeters, etc., and risk communication based on such monitoring results will be conducted to disseminate correct knowledge about radiation.

(2) Practical measures for evacuees to return their homes by NRA

NRA formulated practical measures of radiation protection for the evacuees, who will return their homes, from scientific and technological points of view in cooperation with other governmental organizations. The practical measures stay on addressing the difficulties which the evacuees have been facing. It is expected that the practical measures will be helpful for the evacuees to make decisions whether they return their homes or not.

The detail of these measures taken by NRA is available in the following link:
http://www.nsr.go.jp/english/library/data/special-report_20140204.pdf

4. Related websites

Information is frequently shared in English on the following websites:

- The Ministry of Foreign Affairs:
  http://www.mofa.go.jp/policy/page3e_000072.html
- The Nuclear Regulation Authority:
  http://www.nsr.go.jp/english/
- The Ministry of Economy, Trade and Industry:
  http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/index.html
- The Food Safety Commission of Japan:
  http://www.fsc.go.jp/english/emerg/radiological_index_e1.html
- The Ministry of Health Labour and Welfare:
  http://www.mhlw.go.jp/english/topics/2011eq/index_food_policies.html
- The Ministry of Agriculture, Forestry and Fisheries:
  http://www.maff.go.jp/e/quake/press_110312-1.html
- TEPCO (Information on water leakage):
  http://www.tepco.co.jp/en/nu/fukushima-np/water/index-e.html
- TEPCO (General information on activities onsite):
  http://www.tepco.co.jp/en/nu/fukushima-np/index-e.html

IAEA assessment on aspects presented in the November 2014 report *'Events and highlights on the progress related to recovery operations at Fukushima Daiichi NPS'*

Sea area monitoring results

Sea area monitoring data continues to be published regularly by NRA. The data shows that radionuclide levels in seawater in all the monitored sea areas are well below regulatory limits. Moreover, the concentrations of tritium, strontium-90, caesium-134 and caesium-137 in seawater have been relatively stable, with no significant changes observed during the past three months (August to October 2014). The levels of strontium-90, caesium-134 and caesium-137 in marine sediment for the observed marine areas defined by the Government of Japan have also been stable during the past three months (August to October 2014).

Based on the sea area monitoring results and on other related information that has been made available, the IAEA considers the situation in the marine environment to be stable. The situation should continue to be monitored.

Sea area monitoring data quality assurance

Two IAEA experts visited Japan from 8 to 14 September 2014 to collect water samples from the sea near TEPCO's Fukushima Daiichi Nuclear Power Station, with a view to organizing an inter-laboratory comparison in support of high-quality gathering and analysis of radioactivity data by the responsible authorities in Japan. The visit by the experts was the first follow-up activity to the advisory points on sea area monitoring presented in the report by the IAEA International Peer Review Mission on Mid- and Long-Term Roadmap Towards the Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station Units 1–4, which, in late 2013, had reviewed Japan's efforts to plan and implement the decommissioning of the plant. The water samples collected during the visit were shared between the IAEA Environment Laboratories and Japanese laboratories, and were analysed independently by each.

A second IAEA expert mission to Japan was organized between 4 and 7 November 2014 to present conclusions from the inter-laboratory comparison for caesium-134 and caesium-137 measurements and to collect a new set of seawater samples offshore Fukushima for a further inter-laboratory comparison. The IAEA experts reported that, within the range of acceptable uncertainties, the results for all five seawater samples analysed were identical. The experts also presented the conclusions of a proficiency test conducted with 30 laboratories worldwide, including 12 in Japan. The test focused on the analysis of tritium, strontium-90, caesium-134 and caesium-137 in seawater, and it showed a very good level of proficiency for the Japanese laboratories. In conclusion, both tests have shown a high level of accuracy of the data reported by Japanese laboratories. This conclusion increases confidence that the data regularly reported by NRA presents an accurate picture of the levels of radioactivity in the near-shore coastal waters east of Japan.

Further proficiency tests and inter-laboratory comparisons involving Japanese laboratories will be regularly organized by the IAEA over the next two years to assess the quality of reported monitoring data.

Removal of spent fuel assemblies from Unit 4

According to TEPCO, the removal of all the spent fuel assemblies (1331 assemblies) from Unit 4 to the common pool was completed by 5 November 2014. The IAEA acknowledges TEPCO's continuing efforts to undertake the work in a safe and steady manner and encourages TEPCO to keep implementing its good practices in decommissioning of Fukushima Daiichi NPP, with the highest priority to be placed on the safety of the public, workers and the environment.

Addition of water treatment systems

TEPCO reported that two multi-nuclide removal systems were installed at Fukushima Daiichi NPP to increase the water treatment capacity to 2000 tonnes per day. The IAEA considers that TEPCO's efforts are in line with the advice given by the IAEA review mission on decommissioning in late 2013, and that the improvement of treatment capacity will contribute to accelerating the treatment of the large volume of contaminated water stored on site. The IAEA also encourages TEPCO to continue its practices to further enhance the performance and capacity of the water treatment systems to address the contaminated water problem in a sustainable manner and to reduce the associated risks.

Off-site decontamination

According to the report from Japan, the evacuation order was lifted in a part of Kawauchi Village in Fukushima Prefecture, which used to be designated as an "Area to which evacuation orders are ready to be lifted". The report also states that the restriction on another part of the village was changed from "Area in which the residents are not permitted to live" to "Area to which evacuation orders are ready to be lifted". The IAEA notes that Japan has been making significant efforts in the environmental remediation activities, together with the reconstruction of the infrastructure and the rehabilitation of the local communities to facilitate residents' return. The IAEA encourages Japan to continue its efforts in this regard.

Food products

Based on the information provided by the Ministry of Health, Labour and Welfare, the authorities in Japan are continuing to implement a comprehensive programme of food monitoring and testing. The current regulatory limits for levels of caesium radionuclides in food products remain in force. A surveillance and control regime is in place to monitor radionuclide levels in food (including seafood) against the regulatory limits, in order to ensure that the food supply chain remains safe. According to information provided by the Japanese authorities, the situation with regards to food, fishery and agricultural production remains stable. This information, and the food monitoring to date, does not raise any new or immediate issues regarding the safety of the food supply chain.

Food monitoring data was reported by Japanese authorities for the period between 5 August 2014 and 10 November 2014. These results included 93,736 food samples collected in Japan. Analytical results for 93,569 (99.8 %) of the 93,736 samples indicated that caesium-134 and caesium-137 were either not detected or were below the regulatory limits for radionuclides set by the Japanese

authorities. However, 167 samples were above the regulatory limits for caesium-134 and caesium-137.

Controls on food products from areas where radionuclide levels are above regulatory limits are used to prevent the distribution of food products with radiocaesium above regulatory limits. These restrictions are lifted or revised when testing indicates that food collected from a specific area no longer exceeds the regulatory limits or are introduced in areas where certain food items need to be controlled.

The implementation of protective actions to ensure the safety of the food supply is one facet in maintaining confidence in the safety and quality of food. Initiatives such as public engagement and risk communication are also important in this respect, and the information provided by Japan also illustrates how the authorities are addressing this at both local and national levels.

The IAEA considers that systems are in place and are being implemented that prevent food and agricultural products with levels of caesium radionuclides in excess of the regulatory limits from entering the food supply chain. The revisions and updates to the food restrictions indicate the continued vigilance of the authorities in Japan and their commitment to protecting consumers and trade. Based on the information that has been made available, the Joint FAO / IAEA Division understands that the measures taken to monitor and respond to issues regarding radionuclide contamination of food are appropriate and that the food supply chain is under control.